P/N 151239

The following are some of the most frequently asked questions of the FMST-100 STEREO TRANSMITTER.

1. What is the upper carrier frequency limit? **100MHz**
2. What is the lower frequency carrier limit? **40MHz**
   The BA1404 may function outside of the above limits but characterization testing at the proposed carrier frequency is required.
3. What is the recommended antenna length? **80CM (31.5")**
4. What is the recommended method to set the device up for MONO transmission? **NOTE**: *pins on the BA1404 IC remove C9 leaving #4 open, remove X1 and C5, connect #5 & #6 to ground, Remove R10 leaving pin #13 open, pin #1 is the input.*
5. How stable is the transmission frequency? **To maintain frequency drift we have regulated the Vcc and use an air core coil. This maintains the frequency drift to within + – 100 KHz.**
6. Is there a recommended method to digitally tune the transmission frequency? **No, but a D/A converter may provide this function.**
7. What is typical pin 11 voltage? **0.6v typical.**
8. What is typical pin 13 voltage? **0.6v typical.**
9. What is typical pin 14 voltage? **0.4v typical.**
10. Is there a recommended booster / isolation amplifier for connection between the output and the antenna? **NO.**
11. What is the impedance of the RF amplifier? **50K ohm minimum**
12. What is the input impedance of pin 5? **30K ohm**
13. What is the input impedance of pin 6? **130K ohm**

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FM STEREO TRANSMITTER THEORY OF OPERATION

The BA1404 is a monolithic FM Stereo transmitter IC. It contains a stereo multiplexer, FM modulator,and an RF amplifier, all on one IC. The input circuit provides individual volume control and pre-emphasis circuits. The left and right signals are amplified with separate amplifiers inside the BA1404. These signals are applied to the multiplexer, which switches the signals with the 38 KHz osc. (pins 4,5,& 6). The output of the multiplexer is fed into a buffer and comes out on pin 14. The DC balance of the multiplexer is adjusted by R3 on pins 16 & 17. The L+R, L-R, and the 19KHz pilot are connected to the input of the FM modulator circuit (pin 12). The FM oscillator frequency is determined by L1 and C13, on pins 9 and 10. The RF amplifier output is pin 7 (the input to this stage is connected inside the BA1404). This signal is connected to an antenna. D1 (3.3V zenor) is used to ensure the supply voltage does not exceed the max rating of the BA 1404.

WARNING

Operation of the FMST-100 is subject to part 15 of the FCC Rules and Regulations.

Section 15.239 OPERATION IN THE BAND 88-108 MHz.

(a) Emission from the intentional radiator (antenna) shall be confined within a band 200 KHz wide centered on the operating frequency (the frequency you are transmitting on). The 200 KHz band shall lie wholly within the frequency range of 88-108 MHz.

(b) The field strength of any emissions within the permitted 200 KHz band shall not exceed 250 microvolts per meter at 3 meters.

If you connect an antenna or amplifier which causes the transmitter to operate outside of these guidelines, you are in violation of the FCC Rules and Regulations and are subject to fines, penalties and/or imprisonment as provided by any and all applicable laws.

PARTS LIST FOR THE FMST-100

( )	R1, R2	10K TRIM POT (VERT MOUNT)
( )	R3	50K TRIM POT (VERT MOUNT)
( )	R4, R5	47K RES (YEL VOI ORG)
( )	R6, R7	1K RES (BRN BLK RED)
( )	R8	120 OHM RES (BRN RED BRN)
( )	R9	2.7 K RES (RED VIO RED)
( )	R10	150 K RES (BRN GRN YEL)
( )	R11	330 OHM RES (ORG ORG BRN)

CAPACITORS

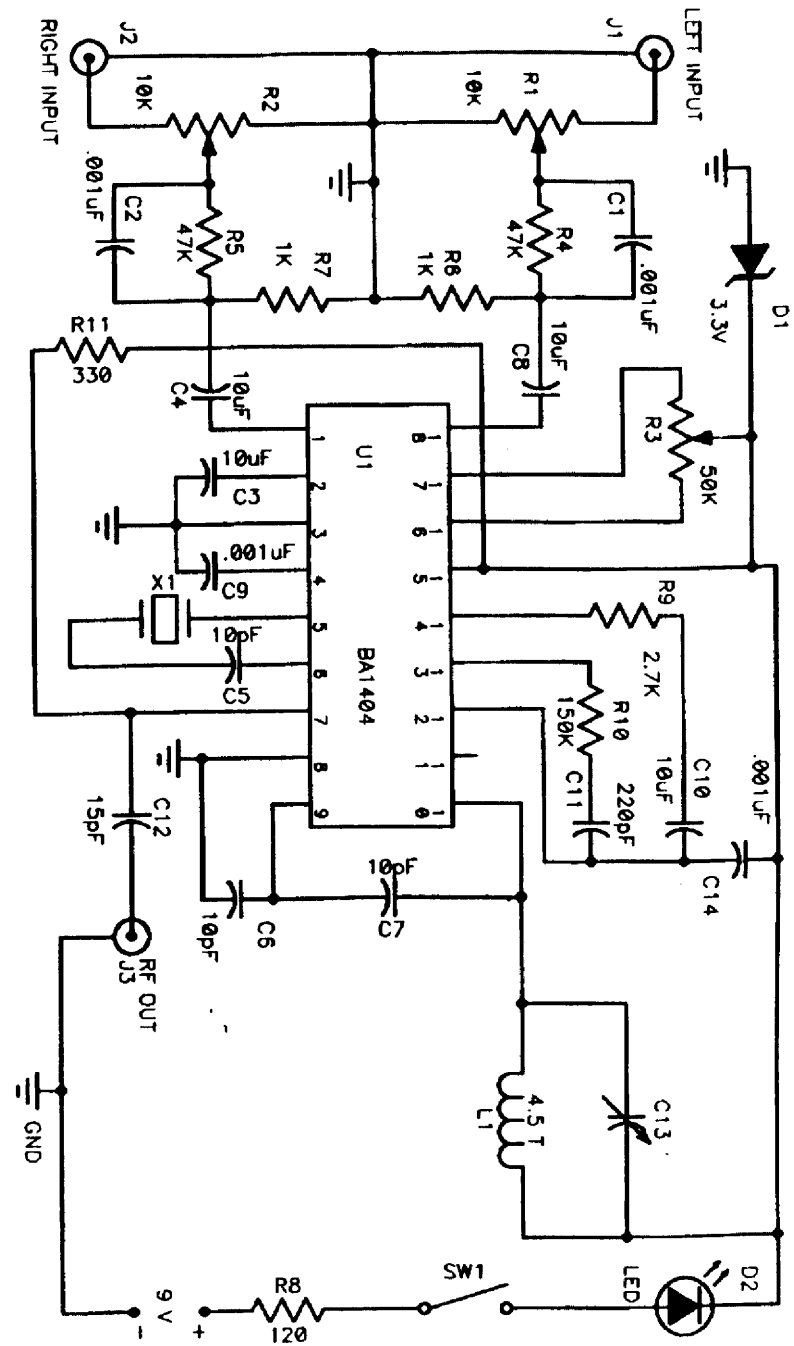
( )	C1 C2 C14	.001 uf (MARKED 102 or .001)
( )	C9	.001 uf (MUST BE MONOLITHIC)
( )	C3 C4 C8 C10	10uF ELECTROLYTIC CAP
( )	C5 C6 C7	10 pF CAP (MARKED 10 or 100)
( )	C11	220 pF CAP (MARKED 220 or 221)
( )	C12	15 pF CER CAP
( )	C13	6 to 60 pF VARIABLE CAP

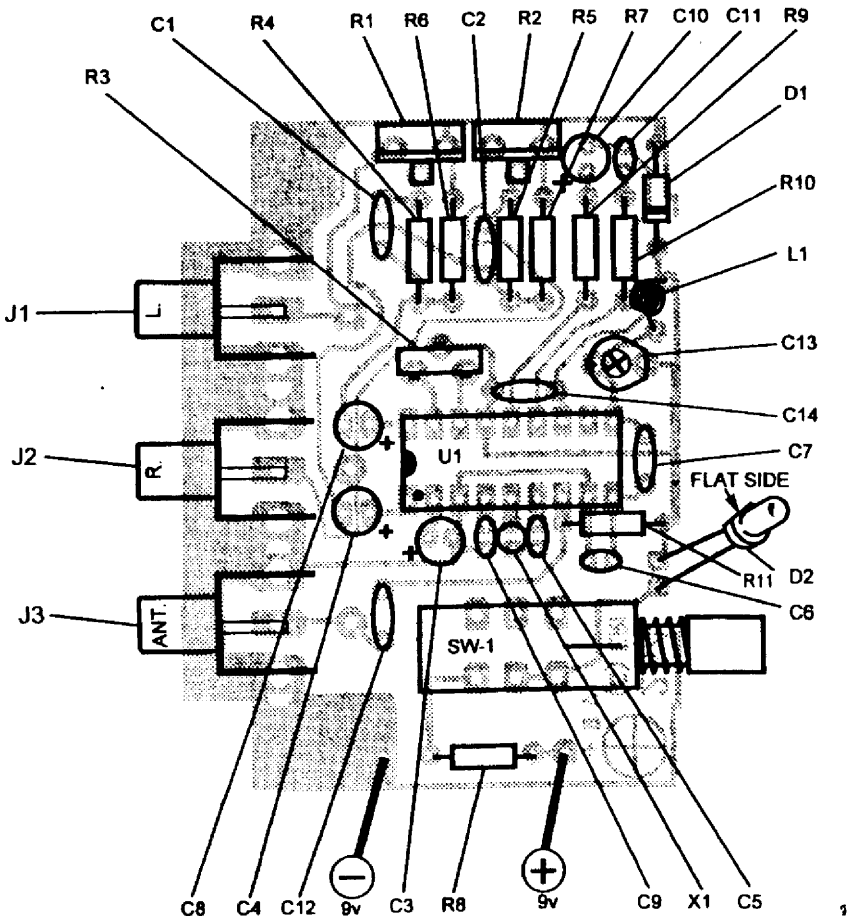
MISCELLANEOUS PARTS

( )	J1 J2 J3	PC MOUNT PHONO CONNECTORS
( )	X1	38 KHz CRYSTAL (SILVER CYLINDER)
( )	D1	3.3 V. ZENOR (1N746)
( )	D2	LED
( )	SW1	PC MOUNT PUSH SWITCH (DPDT)
( )	L1	4.5 TURN COIL (5/32" dia.)
( )	U1	BA1404 IC (RHOM)
( )	PRINTED CIRCUIT BOARD (080-00264)	
( )	9 VOLT BATTERY CONNECTOR	
( )	18 PIN IC SOCKET	

OPTIONAL

( ) CASE FOR THE FMST-100





ASSEMBLY INSTRUCTIONS FOR THE FMST-100

1. ( ) Orient PC board as shown in the assembly drawing.

Insert and solder all of the parts as listed.

2. ( ) R4 47K (yel vio org)
3. ( ) R5 47K (yel vio org)
4. ( ) R6 1K (brn blk red)
5. ( ) R7 1K (brn blk red)
6. ( ) R8 120 0HM (brn red brn)
7. ( ) R9 2.7K (red vio red)
8. ( ) R10 150K (brn grn yel)
9. ( ) R11 330 OHM (org org brn)
10. ( ) D1 3.3V ZENOR - 1N746
11. ( ) 18 pin IC socket - note pin 1 location
12. ( ) L1 4.5 turn coil - do not distort shape
13. ( ) X1 38 KHz crystal (marked ERA)
14. ( ) C1 .001 uF CAP (marked 102 or .001 or 1N)
15. ( ) C2 .001 uF CAP (marked 102 or .001 or 1N)
16. ( ) C3 10 uF Electrolytic (the lead with the line is negative)
17. ( ) C4 10 uF Electrolytic (the lead with the line is negative
18. ( ) C5 10 pF CAP (marked 10 or 100 or 10D)
19. ( ) C6 10 pF CAP (marked 10 or 100 or 10D)

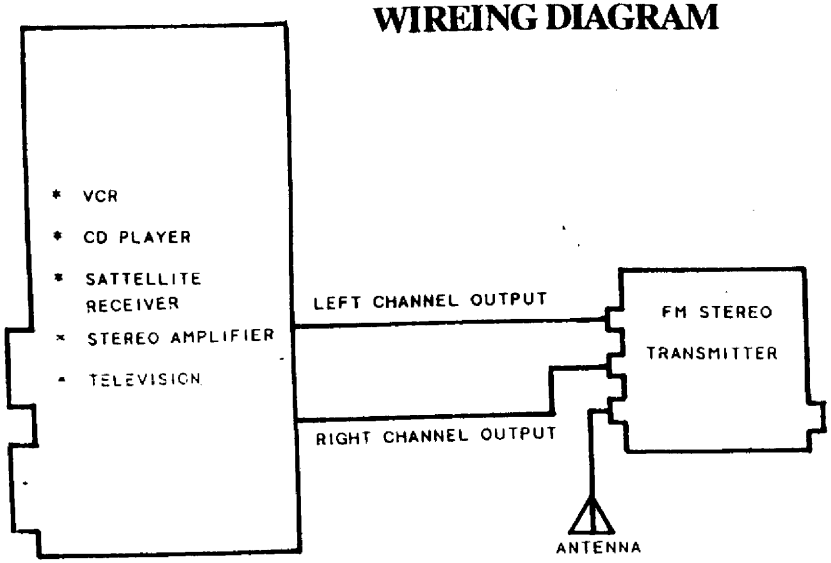
ASSEMBLY INSTRUCTIONS (con't FMST-100)

20. ( ) C7 10 pF CAP (marked 10 or 100 or 10D)
21. ( ) C8 10 uF Electrolytic (the lead with the line is negative)
22. ( ) C9 .001 uF Monolithic Cap Only (marked 102 or .001 or 1N)
23. ( ) C10 10uF Electrolytic (the lead with the line is negative)
24. ( ) C11 220 pF CAP (marked 221 or 220)
25. ( ) C12 15 pF CAP (marked 15)
26. ( ) C13 6 to 60 pF Variable
27. ( ) C14 .001 uF CAP (marked 102 or .001 or 1N)
28. ( ) R1 10K Vertical mount trim pot
29. ( ) R2 10K Vertical mount trim pot
30. ( ) R3 50K Vertical mount trim pot
31. ( ) SW1 PC mounted push switch
32. ( ) J1 PC mounted phono connector
33. ( ) J2 PC mounted phono connector
34. ( ) J3 PC mounted phono connector
35. ( ) 9 volt battery connector
36. ( ) LED if you use the case you should mount the LED with 2" long wires
37. ( ) Very Carefully Check All Connections
38. ( ) Insert U1 into the IC socket (be careful not to bend the leads and watch orientation)

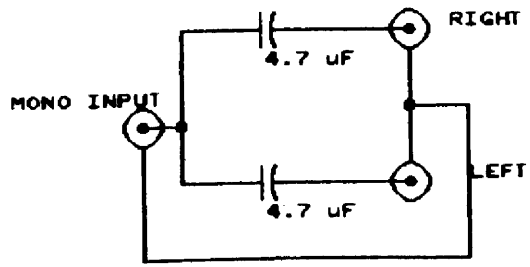
TEST AND TUNING ROR THE FMST-100

1. ( ) Connect a piece of wire to J3 for an antenna.
2. ( ) Connect a 9 volt battery.
3. ( ) Press SW-1 - the LED should light.
4. ( ) Tune an FM radio to a quiet spot on the dial.
5. ( ) Adjust C13 till the 'rushing' sound goes quiet. Adjust R3 until the stereo light is steadily illuminated.
6. ( ) Connect your FMST -100 as shown in the connection drawing.
7. ( ) Adjust R1 and R2 for the best volume (least distortion) on your radio.
8. ( ) Readjust C13 and R3 for the clearest signal on your radio
9. ( ) Readjust R1 and R2 if necessary.
10. ( ) To ensure optimum performance you may need to repeat steps 8 and 9 two or three times.

WIREING DIAGRAM



IF YOU HAVE MONO OUTPUT - YOU CAN SIMULATE STEREO TRANSMISSION WITH THIS SIMPLE CIRCUIT.



FOR PEOPLE WHO HAVE HEARING PROBLEMS

THE FMST-100 CAN BE USED TO TRANSMIT A SIGNAL FROM A TV OR OTHER AUDIO EQUIPMENT TO A PORTABLE STEREO, SUCH AS A WALKMAN. YOU CAN ENJOY YOUR PROGRAMS OR MUSIC WITHOUT BLASTING EVERYONE ELSE. USE THE DIAGRAM SHOWN ABOVE.

ATTENTION KIT BUILDER

Before soldering board, make sure that you have the ability to completely assemble this kit properly.

RETURN POLICY:

Electronic Rainbow will refund the purchase price on any unopened kit LESS postage and a 15% restocking fee.

NO REFUNDS WILL BE MADE ON ANY KITS THAT HAVE BEEN TOUCHED WITH SOLDER.

Electronic Rainbow will repair any of it's kits sent back for the following costs, which includes return postage to the customer:

NO REPAIR WILL BE LOOKED AT UNTIL REPAIR COST IS RECEIVED.

THE COST TO REPAIR YOUR FMST-100 IS $15.00

It doesn't work – now what?
If assembled properly all kits work. ALMOST all of the kits we receive for repair have assembly errors.

Here are some of the more common errors we find.

1. **Parts in the wrong holes.**
2. **Solder shorts.**
3. **Parts in backwards.**
4. **Parts which are not soldered or have cold solder joints.**
5. **Wires which are "frayed" and touching other parts.**

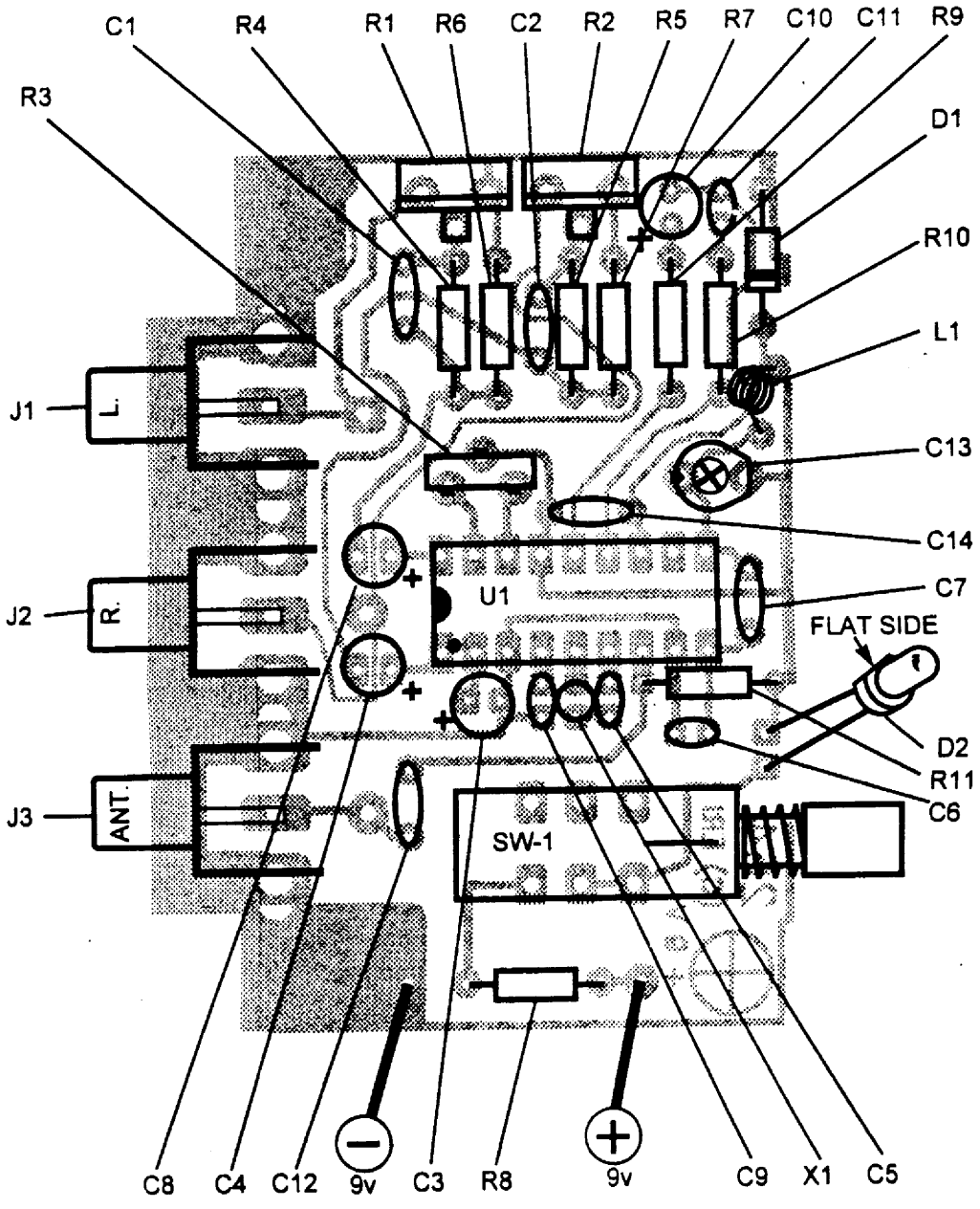
It is very difficult to objectively check your own work. Have some one else look over your completed kit. This can save a lot of time, frustration and money. If you need technical assistance you are welcome to call or write.

For repair send your kit to:
Electronic Rainbow Ind., Inc.
6227 Coffman Rd. Indianapolis, IN 46268

Phone **317-291-7262** FAX 317-291-7269
INTERNET: www.rainbowkits.com

*If you must return your kit for repair we must charge for our technicians time. If a part is defective there is **NO CHARGE**. However we cannot warrant the kit builders ability, only the parts.*

FMST-100


C1
R4
R1
R6
C2
R2
R5
R7
C10
C11
R9
R3
D1
R10
L1
J1
L
C13
C14
U1
C7
J2
R
FLAT SIDE
D2
R11
C6
J3
ANT.
SW-1
C8
C4
C12
9v
C3
R8
9v
C9
X1
C5